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(54) Method and apparatus for computer software distribution, installation, and maintenance

(57) A computer software installation, distribution and maintenance method that manufactures one or more software products on an end user's target computer system. The method operates by generating a set of blueprints and raw materials for one or more software products to be distributed; provides the blueprints and raw materials to an end user; and manufactures the software products on the target computer according to the blueprints and using the raw materials. The method optionally provides for the testing of the target computer to determine its suitability for operating the software products, determines whether and updates to the software products are available and obtains them prior to manufacture; and tests and/or demonstrates the software products after manufacture.

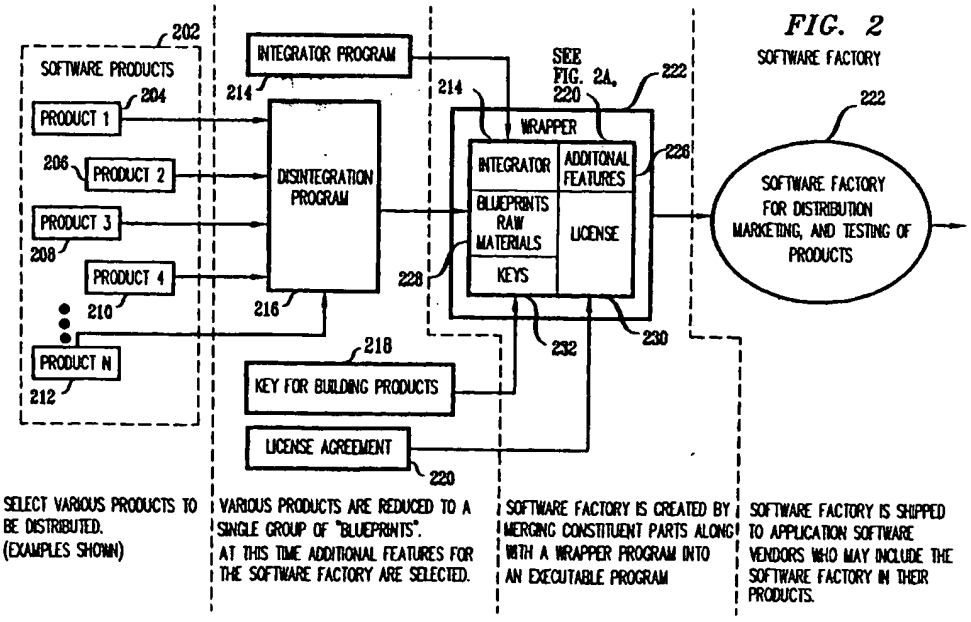


FIG. 2

EP 0 905 615 A2

Description

TECHNICAL FIELD

[0001] This invention relates generally to the field of computer software and in particular to a method for the distribution, installation and maintenance of computer software.

BACKGROUND OF THE INVENTION

[0002] The easy and reliable distribution, installation and maintenance of software programs for use in computer systems, has been a problem that has forever plagued the software industry. Historically, when computer systems were relatively large, isolated systems shared by a number of users and a new software program was distributed, a human technician would travel to the computer system and install the appropriate program(s) and/or components necessary for the local operation software program on the computer system. In the event that its producer updated the software program , then a technician would again have to travel to the computer system and apply the update. Of course, the proliferation of computer workstations and personal computers has driven this method of distribution, installation and maintenance into obsolescence.

[0003] In particular, and as technology has improved, it has become commonplace for the producers of software programs to distribute their products on high-capacity media such as diskettes, or compact discs (CD). Oftentimes the software programs comprise a collection of independent modules that provide different functionality or serve to tailor the software program to a particular environment. By combining these modules in a particular manner, a tailored software program is assembled on the end user computer system that is generally specific to that system and the end user's requirements.

[0004] Unfortunately, many end users of software programs lack either the technical ability or desire or both to substantially contribute to the installation of a complex software program. As a result, the producers of the software programs have provided their products with installation programs that automate the software installation process sufficiently to permit an end-user of the software program to perform his/her own installation.

[0005] In operation, such an installation program will typically guide the end user through the installation process by querying the end user for specific functionality/components required in the end user software program. Typically, this query is performed by presenting the end user with a list of available or proposed components from which the end user makes one or more selections. Based upon the selection(s), the installation program assembles an end user software program from one or more of the components or modules.

[0006] Of course, the actual installation program can be quite complex even though many of its features are hidden from the end user. For example, an installation program can install applications, user preferences, system extensions, control panels and much more. Among its many capabilities, an installation program may: check to see whether a target computer meets minimum system requirements to permit an installation to continue; search for files or folders on a target disk; delete or move older or conflicting files; install files or folders; display a license agreement before starting the installation; display a "readme.txt" file after the installation is complete; and create an un-install program on the end user's computer.

[0007] Additionally, the components or modules associated with an installation are frequently distributed as compressed or encrypted (or both) files. Oftentimes such compressed/encrypted components are combined together in a package, i.e., as a single "self-extracting" executable program. When such a self-extracting program is run, it unpackages all of the components and de-crypts and decompresses them as appropriate. FIG. 1 shows in simplified block diagram form, this generalized software distribution and installation.

[0008] The primary aim of such an install program is to make installation of the software program simple, easy and straightforward. Oftentimes, comprehensive context-sensitive help is made available to the end user by the installation program. Additionally, once the software program is installed, the end user will often use the installation program to modify or update the software program at a later date.

[0009] Even this type of automated installation process is too often subject to errors. As noted previously, end users are oftentimes either disinterested or incapable of providing necessary responses to the installation program sufficient to produce a correct software program. More insidious, are inadvertent media errors in the component or modules provided by the software producer that may preclude their assembly into an operating software program. Additionally, even if the end user and installation program successfully assemble the components into an operational program, it oftentimes is not optimal for the end user computer system because of peculiarities associated with that system. Finally, any difficulties associated with the initial installation are often repeated during a likely update to the software program thereby compounding the problem.

[0010] Still more recently, the above methods and systems for installation and upgrading of end user software programs have been enhanced through the use of local area and wide area networking technologies. Specifically, local copies of program modules are frequently placed on a server connected to an end user computer system via local area or wide area (i.e., world-wide-web) protocols. In this manner, the end user frequently has access to a most recent copy/update to the software program, thereby facilitating its maintenance. Despite these improvements however, many of the above stated problems associated with the distribution, installation

and maintenance of software still exist.

SUMMARY OF THE INVENTION

[0011] The above problems are overcome and advance is made over the prior art in accordance with the principles of the present invention directed to a method and apparatus for the distribution, installation and maintenance of computer software in which software programs are manufactured on a target computer. Advantageously, the manufactured programs are specific to a particular end user's needs and target system's capabilities, as opposed to merely being a program distributed as a fixed set of modules.

[0012] Viewed from one aspect, the present invention is directed to a method for the distribution, installation and maintenance of software programs on an end user's target computer system in which the software programs are manufactured on the target computer system. The method operates by generating a set of blueprints and raw materials for one or more software products to be distributed; delivers the blueprints and raw materials to an end user and, manufactures the software products on the target computer according to the blueprints and using the raw materials. The method optionally provides for the testing of the target computer to determine its suitability for operating the software products, determines whether any updates to the software products are available and obtains them prior to manufacture; and tests and/or demonstrates the software products after manufacture. Viewed from another aspect, the present invention is directed to an apparatus for providing the method, namely a "cyber factory" that performs the above method on the end user's target computer.

[0013] Further features and advantages of the present invention, as well as the structure and operation of various embodiments of the present invention are described in detail below with reference to the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

[0014] The teachings of the present invention can be readily understood by considering the following detailed description in conjunction with the accompanying drawings, in which:

FIG. 1 is a flow diagram depicting a prior art method of computer software distribution;

FIG. 2 shows in simplified block diagram form, a method for software distribution and accompanying software factory according to the present invention;

FIG. 3 shows in simplified block diagram form, software distribution from the perspective of an application software vendor according to the present invention;

FIG. 4 shows in simplified block diagram form, software distribution from the perspective of an end user according to the present invention;

FIG. 5 is a flow diagram depicting a software disintegration method according to the present invention;

FIG. 6 is a flow diagram depicting a software integration method according to the present invention;

FIG. 7 is a flow diagram depicting a preferred method according to the present invention; and

FIG. 8 shows in simplified block diagram, an apparatus according to the present invention.

DETAILED DESCRIPTION

[0015] A preferred embodiment of the invention will now be described while referring to the figures, several of which may be simultaneously referred to during the course of the following description.

[0016] With reference to FIG. 1, there it shows a flow diagram depicting prior art software distribution generally described previously. Specifically, one or more source files 102, 104 and 106 created by a software vendor are encrypted and/or compressed 108 into an installation executable file 110. As those skilled in the art will readily appreciate, any number of well known encryption / compression methods may be used either alone or in combination to act on the source files 102, 104 and 106 for subsequent incorporation into an executable file 110.

[0017] Representative installation executables such as installation executable 110, are also well known in the art and provide a convenient "package" for subsequent distribution on a suitable medium such as floppy disk, tape, compact disc (CD) or electronic, i.e., internet to end-users of software. Typically, the installation executable 112 is run by the end user on the target computer and through the action of the target computer executing the installation executable 112, the source files 114, 116 and 118 are decrypted / uncompressed onto the target computer.

[0018] Turning our attention now to FIG. 2, there is shown in simplified block diagram form the subject of the present invention, namely our inventive software factory and accompanying method(s). Briefly, software product set 202 includes one or more individual software products, 204 through 212 that are reduced to component raw materials and blueprints through the action of disintegration program 216, and subsequently combined with other components into software factory 222 for eventual distribution and installation by an end user (not shown).

[0019] Specifically, software products 202 comprising one or more individual products, product-1 204 through product-N 212 are "disintegrated" through the action of

disintegrator 212 into raw materials and blueprints 228 for inclusion into software factory 222. Also included into the software factory are keys 232, which provide access to various components of the software factory 222 thereby permitting or denying construction of particular products as appropriate; license(s) 230 which impart or deny certain rights associated with the particular software products during their manufacture; blueprints and raw materials 228 which are preferably produced through the action of disintegrator 216; and integrator 214 which physically manufactures the software products 202 on end user computer system. Finally, wrapper 224 packages and optionally provides mechanisms for subsequent unpackaging of the software factory components. As was used in the prior art, the wrapper 224 may be one of many known in the art, i.e., self-extracting executable wrappers.

[0020] Additional features 226 may be incorporated into the software factory prior to wrapping. In particular, additional features 226 include those features useful or desirable for end user installation, i.e., selection of product(s) to manufacture; marketing product(s) by displaying on-screen advertisements during manufacture/installation or operation; testing and/or demonstrating the products; tutorial on use of the product(s); determination of performance / system resources of end user computer system; and electronic connection to vendor site for update retrieval during manufacture. Of course, those skilled in the art will recognize that this list is not complete, and that any number additional features may be incorporated into our inventive software factory 222 as needed/desired. Once these constituent parts are packaged together, they are subsequently shipped as the software factory 222 to application software vendors or alternatively to end users.

[0021] With reference now to FIG. 3, the software factory 222 as originally assembled is received by an application software vendor for incorporation with that vendor's products. Specifically, an application software package 304 is constructed by the application software vendor which contains the software factory 222 and an application software product and optional installer 302. These components (the software factory 222 and software product 302) are assembled into a final application software package 304 and subsequently distributed by the application software vendor, to end users.

[0022] FIG. 4 depicts, in simplified block diagram form, the steps associated with the receipt of the software package 304 by an end user. In particular, the application software package 304 is received by the end user who begins an installation process on a target computer 402. In one embodiment, the application software 302 provided by the application software vendor is installed and then the software factory operation is initiated. As depicted in FIG 4, the software factory may provide the end user with the terms associated with any license(s) 404. If the user rejects the terms of such license(s), then the software factory shuts down without manufacturing the software products (204 through 212 in FIG. 2). If on the other hand, the end user accepts any license(s), then the software factory manufactures the software products 204, 206,208,210 and 212 on the end user's target computer system.

[0023] Of course the features and functions performed by the software factory 222 is not limited to the simple licensing example described above. Specifically, prior to manufacture and subsequent to license acceptance/rejection, the software factory 222 may optionally query the end user to determine what particular software products the end user wishes to manufacture. Additionally, the software factory 222 may test the end user's target computer system to determine whether or not it meets minimum performance requirements necessary for the operation of the software products selected for installation.

[0024] As those skilled in the art will readily appreciate, the software industry is rapidly moving, and new releases or updates to software occur frequently. Consequently, software products in distribution channels are oftentimes not the most recent releases. Advantageously, the software factory 222 may electronically connect to a software vendor during the manufacture of software products 202 and determine whether or not the software products are the most recent ones available. If not, the software factory may initiate a download of any necessary blueprints and/or additional components required for manufacture and/or installation on the target computer. In this inventive manner, the end user is assured that he/she has the most recent product(s) and that they are particularly "tailored" for the target computer.

[0025] Importantly, this download feature is not limited to a single manufacture. Specifically, the software factory 222 may re-connect electronically to the software vendor at a later date to determine whether the manufactured products are the most recent/appropriate at that later date. If not, then once again any necessary blueprints and/or additional components may be retrieved and new software products may be manufactured on the target computer. In this manner, the on-going maintenance of the manufactured and installed software products is preserved.

[0026] Furthermore, the software factory 222 may advantageously test and/or demonstrate the manufactured software products after installation. A variety of well-known, "help", "demonstration" and/or "tutorial" features are easily incorporated into the software factory 222. Finally, the software factory 222 may display to the end user advertisements for complementary software products based upon the end user's target computer and its local environment. Advantageously, the advertisements may be uniquely specific to that particular end user and target system. Of course, if the end user decides that an advertised product is desirable, then the software factory 222 may optionally electronically acquire the product and subsequently install it on the target computer.

[0027] Described so far has been the overall operation of our inventive software factory. An important function of the factory, shown in FIG 5 and FIG. 6 respectively, is the inventive disintegration and integration of software products included with the factory for manufacture. With reference now to FIG. 5, there is shown the disintegration of a software product into blueprints and raw materials for inclusion in the software factory. In particular, software product 502, which is to be disintegrated, is a collection of bits (1's and 0's) in some ordered arrangement, i.e., a file. As illustrated in FIG. 5 and shown in block 504, the first 2^M bytes of the software product file 502 are retrieved by the disintegrator 500. A blueprint of the software product file 502 is compiled, according to block 506, by counting the binary 1's and 0's contained in the software product file 502 as shown in block 508. This process is repeated, retrieving the next 2^M bytes of the software product file 518; compiling a blueprint of the software product by counting the binary 1's and 0's 506 until and end of file indicator is retrieved 510; at which time file disintegration is determined to be complete 512.

[0028] At this point in the process, the counted binary 1's and 0's are placed in a blueprint file 522 and the total number of 1's and 0's contained in the blueprint are summed 514, and the resulting numbers of 1's and 0's are placed into a raw materials file 524 that contains the binary "raw materials" necessary to regenerate the software product file 502. As shown in FIG. 5, the output of the disintegrator 500, namely the blueprint file 522 and the raw materials file 524, may advantageously be combined into a single output file 520.

[0029] With reference now to FIG. 6, there is shown the process by which the original software product file 502 is regenerated from the disintegrator output file 520. Specifically, disintegrator output file 520 containing both blueprint file 522 and raw materials file 524 is input to the integrator 600, where it is utilized by the integrator 600 to reintegrate the original software product file 502. More specifically, the blueprint file 522 is read by integrator (block 602) and utilizing the binary raw materials contained in the raw materials file 524, the integrator reassembles the original binary representation of the original software product 502 (block 604). This process of reading the blueprint file 52 and reassembling the original software product 502 is continued until an end of file indicator is reached in the blueprint file (block 608). When the end of file indicator has been reached, the original software product 502 has been regenerated and may be advantageously written to a file. Advantageously, those skilled in the art will quickly recognize that the integration process utilized in our inventive software factory may exhibit a built-in check, namely the quantity of raw materials used in the integration. In particular, if the raw materials file 524 does not contain sufficient raw materials to reintegrate the original software product 502 according to the blueprint file 522, then the integrator may determine that an error exists in one or both of these files, and that an appropriate error recovery strategy is appropriate, i.e., connect to a vendor's electronic service site for download of additional materials and/or blueprints.

[0030] Additionally, such a check made during the manufacture of the software product(s) 502 advantageously permits the end user to selectively determine which software product(s) 502 are manufactured and in what quantity. In contrast, several known "anti-copying" methods employed in the prior art merely count the number of times a particular file is copied and not the quantity of raw material consumed. With our inventive method, the end user may determine that all of the raw materials are to be used, for example, to manufacture many copies of the same software product. Only when the raw materials are consumed, will the subsequent manufacture be impossible.

[0031] Turning our attention now to FIG 7., a flow diagram depicting a preferred embodiment of the present inventive method is shown. Specifically, software products (block 703) and associated files (block 702) are disintegrated (block 704) into a set of blueprints (shown as PROD.BP in block 705). Those skilled in the art will appreciate that the raw materials used for the software products 703 and associated files 702, may optionally be included in this PROD.BP file.

[0032] The blueprints (and optional raw materials) are preferably merged with integrator (block 706) by merge program (block 707) into a single package shown in FIG. 7 as combined WINTEG.EXE (block 709) and PROD.BP (block 708). Not explicitly shown in FIG. 7, this single package may be one of many known in the art, i.e., a self-extracting executable. As depicted by the horizontal dotted line, these steps and components depicted by blocks 702-708 would typically be performed by a software vendor. Of importance, and noted in FIG. 7., disintegrator (block 704) and integrator (block 706) may optionally contain corresponding encoder/decoder or compressor/decompressor respectively (not shown). Advantageously, by utilizing such encoder/decoder combination the blueprint output by the distintegrator (block 704), namely PROD.BP (block 705) may be made suitably small for efficient transmission to an end user.

[0033] The combined WINTEG.EXE (block 709 and PROD.BP (block 708) are provided to an end user by one of a variety of means known in the art, i.e., floppy disk, CD-ROM, magnetic tape, or electronic download (FTP, WWW). Shown in FIG. 7., the combined WINTEG.EXE (block 709) and PROD.BP (block 708) have been renamed into PRODFact.exe (block 710). As noted previously, PRODFact.exe is preferably a self-extracting executable file which when executed on a target computer by an end user, manufactures the software product(s) (block 712) and any associated files (block 711).

[0034] Finally, with reference now to FIG. 8., there is shown a block diagram for a computer system in which the present invention may be practiced. Specifically, computer system 800, comprises processor 802, mem-

ory 804 and input/output 806 subsystems interconnected via interconnect 808. Computer system 800 is connected communications network 814 via communications path 810 and local mass storage system 816 via interface 816. Mass storage system 816 may be any of those known in the art such as magnetic discs or CD-ROM devices. Similarly, communications network 814 may be local or wide area network through which computer system 800 communicates to other computer systems.

Claims

1. A computer software distribution, installation and maintenance method comprising the steps of:

   generating a set of blueprints and a set of raw materials for one or more software products;
   providing the blueprints and raw materials to an end user; and
   manufacturing, on an end user target computer system, the software products described by the blueprints, using the raw materials provided.

2. The method according to claim 1 wherein the generating step comprises the step of: disintegrating a software product into a blueprint file and a raw materials file.

3. The method according to claim 2 wherein the manufacturing step comprises the step of:

   reintegrating, the software products described by a blueprint file and a raw materials file.

4. The method according to claim 3 wherein said disintegrating step comprises the steps of:

   retrieving, 2^M bytes of the software product;
   compiling, a blueprint of the software product by counting binary 1's and 0's contained in the software product;
   repeating, the above retrieving and compiling steps until an end of file indicator is retrieved from the software product;
   compiling, the blueprint into a blueprint file;
   determining, from the blueprint, a quantity of raw materials necessary to rebuild the software product and;
   writing that determined quantity of raw materials into a raw materials file.

5. The method according to claim 4 wherein said disintegration step further comprises the step of combining the blueprint file and the raw materials file into a single, disintegrator output file.

6. The method according to claim 5 wherein said reintegration step comprises the steps of:

   reading the blueprint file;
   reassembling, an original binary representation of the software product using the raw materials contained in the raw materials according to the blueprint;
   repeating, the above reading and reassembling steps until an end of file indicator is read from the blueprint file.

7. The method according to claim 6 wherein said regeneration step further comprises the step of:

   verifying, that the software product has been accurately reassembled from a quantity of raw materials used for reassembly.

8. The method according to claim 1 further comprising the step of:

   determining, prior to the manufacturing, whether the target computer possesses a set of characteristics necessary for a correct operation of the software products on the target computer.

9. The method according to claim 8 further comprising the step of:

   determining, prior to the manufacturing, whether the software products are most recent and if not, obtaining the most recent software products prior to the manufacturing.

10. The method according to claim 9 further comprising the step of:

    testing the software products subsequent to their manufacture.

11. The method according to claim 10 further comprising the step of:

    demonstrating the software products to the end user.

12. The method according to claim 11 further comprising the step of:

    displaying, on the target computer, one or more advertisements for additional products.

13. An apparatus for the distribution, installation, and maintenance of computer software products comprising:

    means for manufacturing, on an end user target

computer system, the computer software products from a set of blueprints and a sufficient quantity of raw materials;
means verifying that the software products may be successfully manufactured; means for licensing the software products to an end user;
means for providing additional features to the software products during their manufacture; and
means for packaging the manufacturing means, the verifying means, the licensing means and the additional feature providing means such that they may be conveniently distributed and unpackaged on an end user target computer system.

14. The apparatus according to claim 13 in which said manufacturing means further comprises:

means for decoding the blueprints, raw materials and additional features.

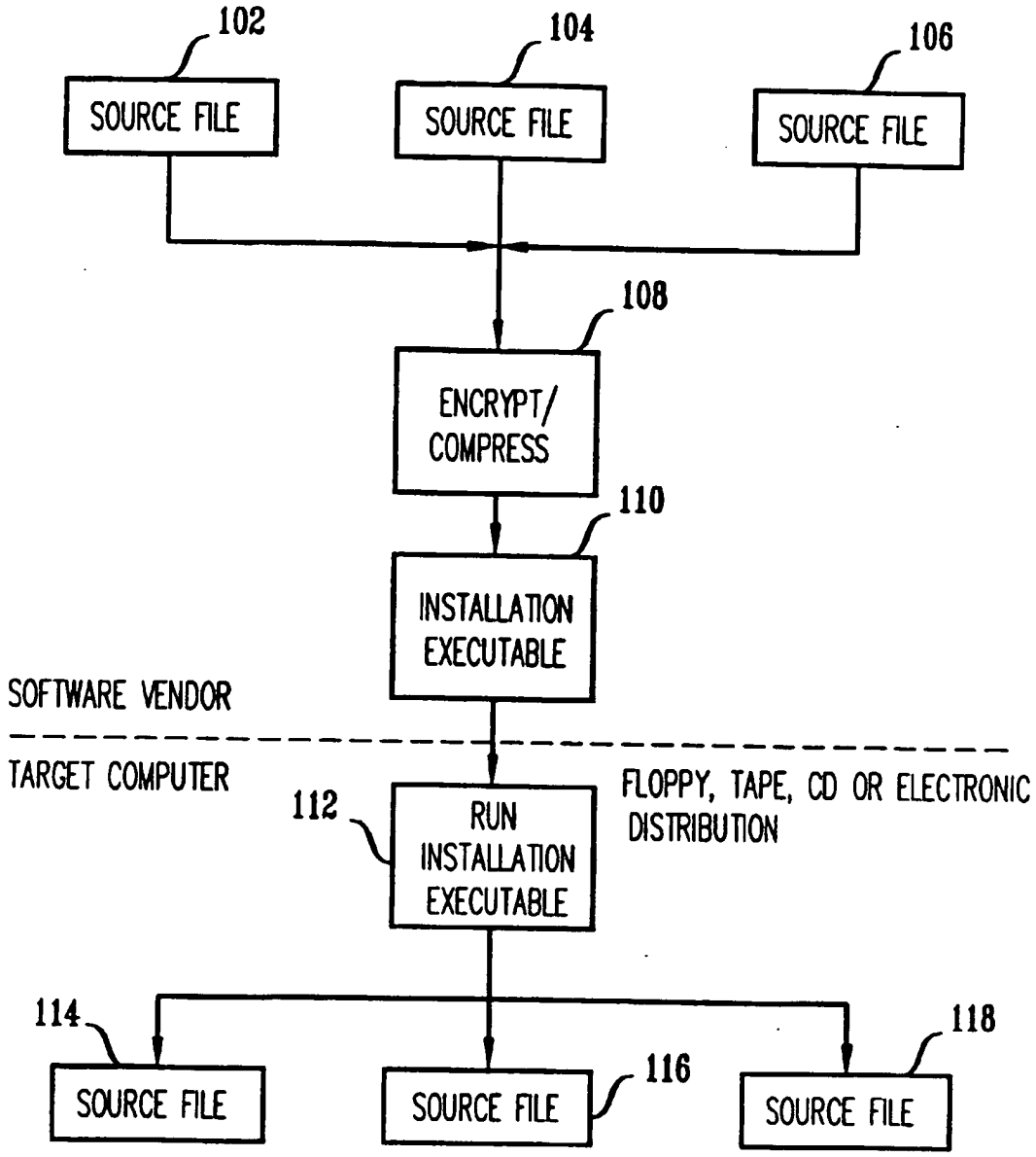
15. The apparatus according to claim 14 in which said packaging means further comprises:

means for extracting the manufacturing means, the verifying means, the licensing means, the additional feature providing means and the blueprints and raw materials from the package.

16. The apparatus according to claim 15 in which said extracting means comprises a self-extracting executable file.

FIG. 1

(PRIOR ART)



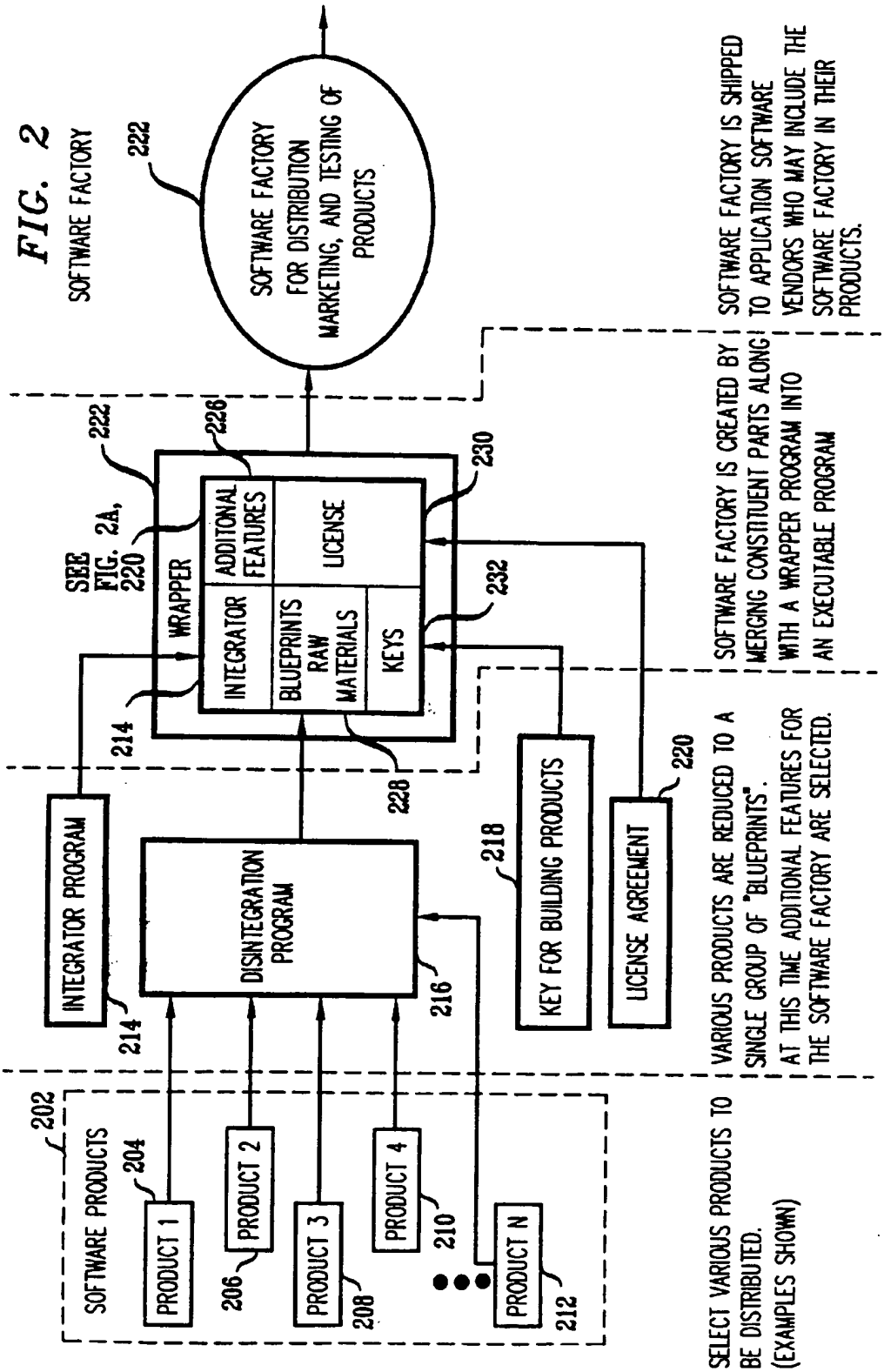

SOFTWARE FACTORY
SOFTWARE FACTORY FOR DISTRIBUTION MARKETING, AND TESTING OF PRODUCTS
222
SEE FIG. 2A, 220
WRAPPER
ADDITIONAL FEATURES
LICENSE
INTEGRATOR
BLUEPRINTS RAW MATERIALS
KEYS
226
230
232
214
228
INTEGRATOR PROGRAM
DISINTEGRATION PROGRAM
216
218
KEY FOR BUILDING PRODUCTS
LICENSE AGREEMENT
220
202
SOFTWARE PRODUCTS
204
PRODUCT 1
206
PRODUCT 2
208
PRODUCT 3
210
PRODUCT 4
PRODUCT N
212
SELECT VARIOUS PRODUCTS TO BE DISTRIBUTED. (EXAMPLES SHOWN)
VARIOUS PRODUCTS ARE REDUCED TO A SINGLE GROUP OF "BLUEPRINTS". AT THIS TIME ADDITIONAL FEATURES FOR THE SOFTWARE FACTORY ARE SELECTED.
SOFTWARE FACTORY IS CREATED BY MERGING CONSTITUENT PARTS ALONG WITH A WRAPPER PROGRAM INTO AN EXECUTABLE PROGRAM
SOFTWARE FACTORY IS SHIPPED TO APPLICATION SOFTWARE VENDORS WHO MAY INCLUDE THE SOFTWARE FACTORY IN THEIR PRODUCTS.

FIG. 2

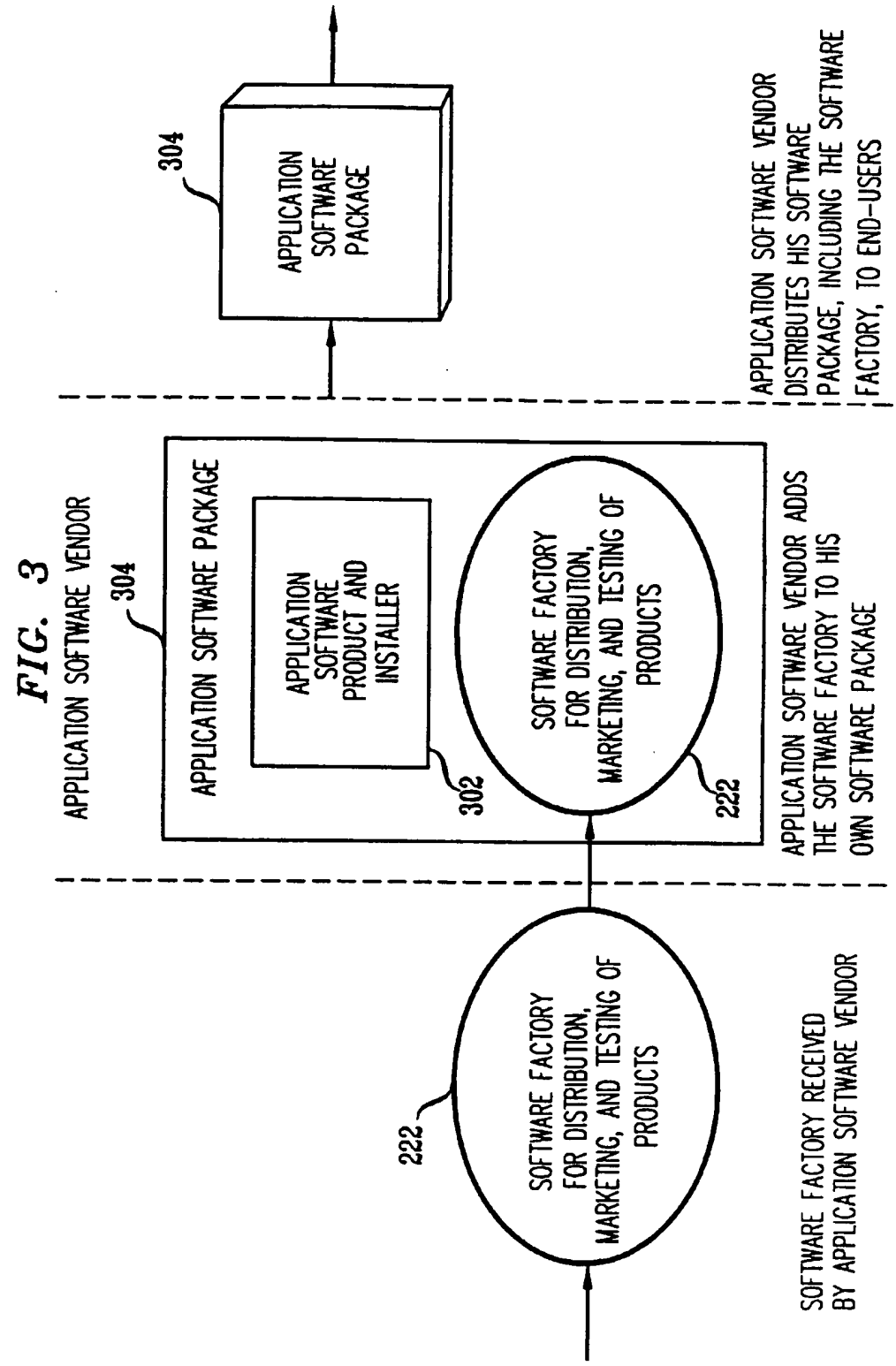
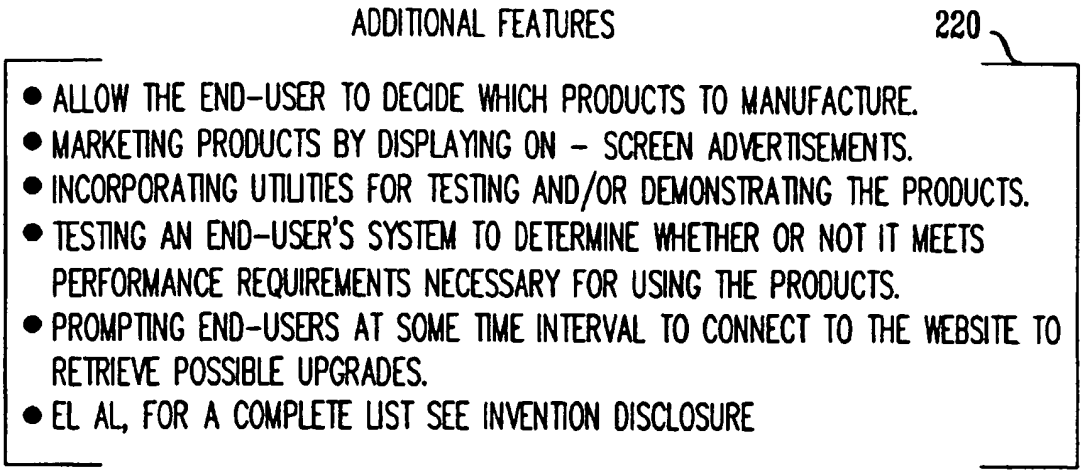

APPLICATION SOFTWARE VENDOR
SOFTWARE FACTORY RECEIVED BY APPLICATION SOFTWARE VENDOR
222
SOFTWARE FACTORY FOR DISTRIBUTION, MARKETING, AND TESTING OF PRODUCTS
APPLICATION SOFTWARE VENDOR ADDS THE SOFTWARE FACTORY TO HIS OWN SOFTWARE PACKAGE
APPLICATION SOFTWARE PACKAGE
304
APPLICATION SOFTWARE PRODUCT AND INSTALLER
302
SOFTWARE FACTORY FOR DISTRIBUTION, MARKETING, AND TESTING OF PRODUCTS
222
APPLICATION SOFTWARE VENDOR DISTRIBUTES HIS SOFTWARE PACKAGE, INCLUDING THE SOFTWARE FACTORY, TO END-USERS
304
APPLICATION SOFTWARE PACKAGE

FIG. 3

FIG. 2A


ADDITIONAL FEATURES
220
• ALLOW THE END-USER TO DECIDE WHICH PRODUCTS TO MANUFACTURE.
• MARKETING PRODUCTS BY DISPLAYING ON - SCREEN ADVERTISEMENTS.
• INCORPORATING UTILITIES FOR TESTING AND/OR DEMONSTRATING THE PRODUCTS.
• TESTING AN END-USER'S SYSTEM TO DETERMINE WHETHER OR NOT IT MEETS PERFORMANCE REQUIREMENTS NECESSARY FOR USING THE PRODUCTS.
• PROMPTING END-USERS AT SOME TIME INTERVAL TO CONNECT TO THE WEBSITE TO RETRIEVE POSSIBLE UPGRADES.
• EL AL, FOR A COMPLETE LIST SEE INVENTION DISCLOSURE

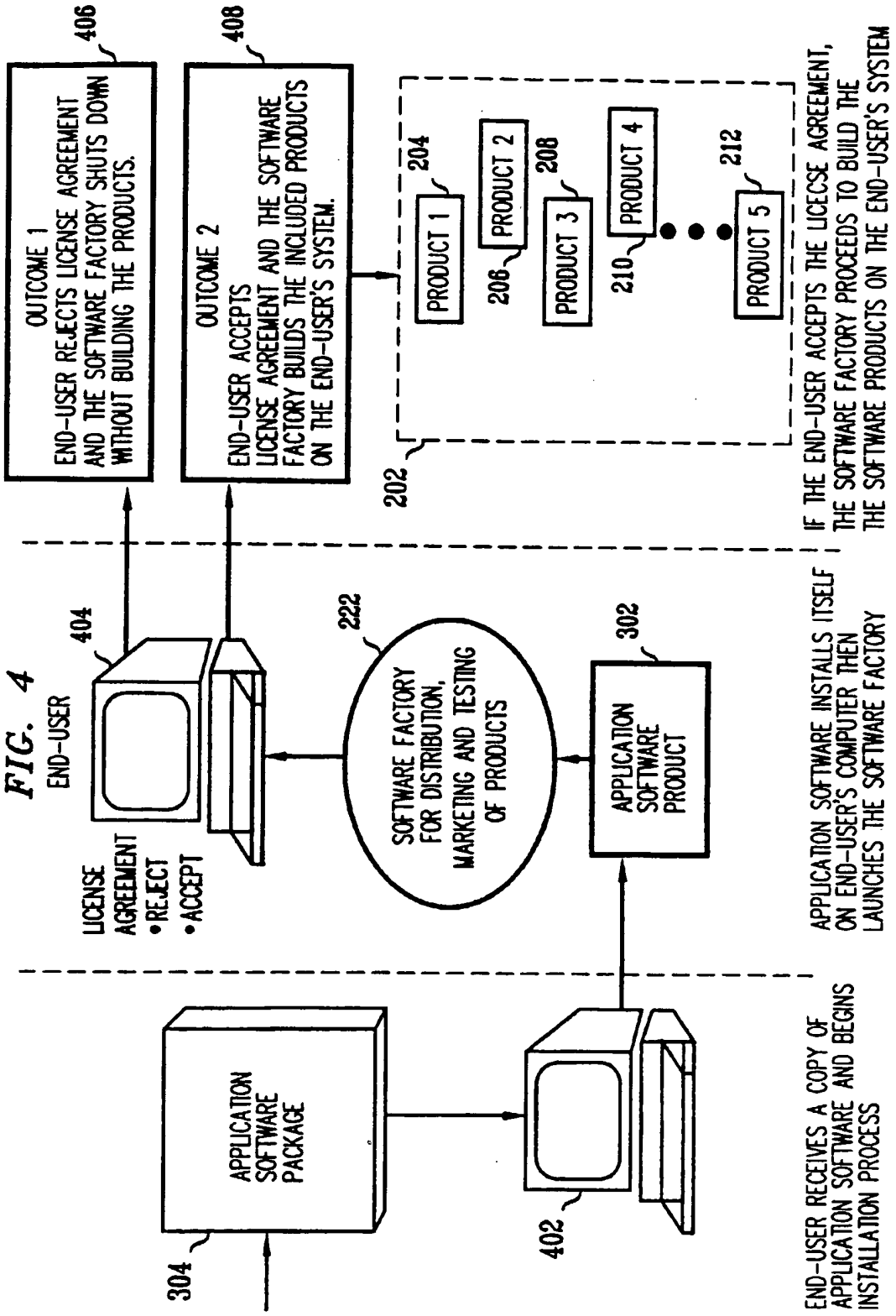

406
OUTCOME 1
END-USER REJECTS LICENSE AGREEMENT AND THE SOFTWARE FACTORY SHUTS DOWN WITHOUT BUILDING THE PRODUCTS.
408
OUTCOME 2
END-USER ACCEPTS LICENSE AGREEMENT AND THE SOFTWARE FACTORY BUILDS THE INCLUDED PRODUCTS ON THE END-USER'S SYSTEM.
202
204
PRODUCT 1
206
PRODUCT 2
208
PRODUCT 3
210
PRODUCT 4
212
PRODUCT 5
IF THE END-USER ACCEPTS THE LICECSE AGREEMENT, THE SOFTWARE FACTORY PROCEEDS TO BUILD THE THE SOFTWARE PRODUCTS ON THE END-USER'S SYSTEM
404
END-USER
LICENSE AGREEMENT
•REJECT
•ACCEPT
222
SOFTWARE FACTORY FOR DISTRIBUTION, MARKETING AND TESTING OF PRODUCTS
302
APPLICATION SOFTWARE PRODUCT
APPLICATION SOFTWARE INSTALLS ITSELF ON END-USER'S COMPUTER THEN LAUNCHES THE SOFTWARE FACTORY
304
APPLICATION SOFTWARE PACKAGE
402
END-USER RECEIVES A COPY OF APPLICATION SOFTWARE AND BEGINS INSTALLATION PROCESS

FIG. 4

FIG. 5

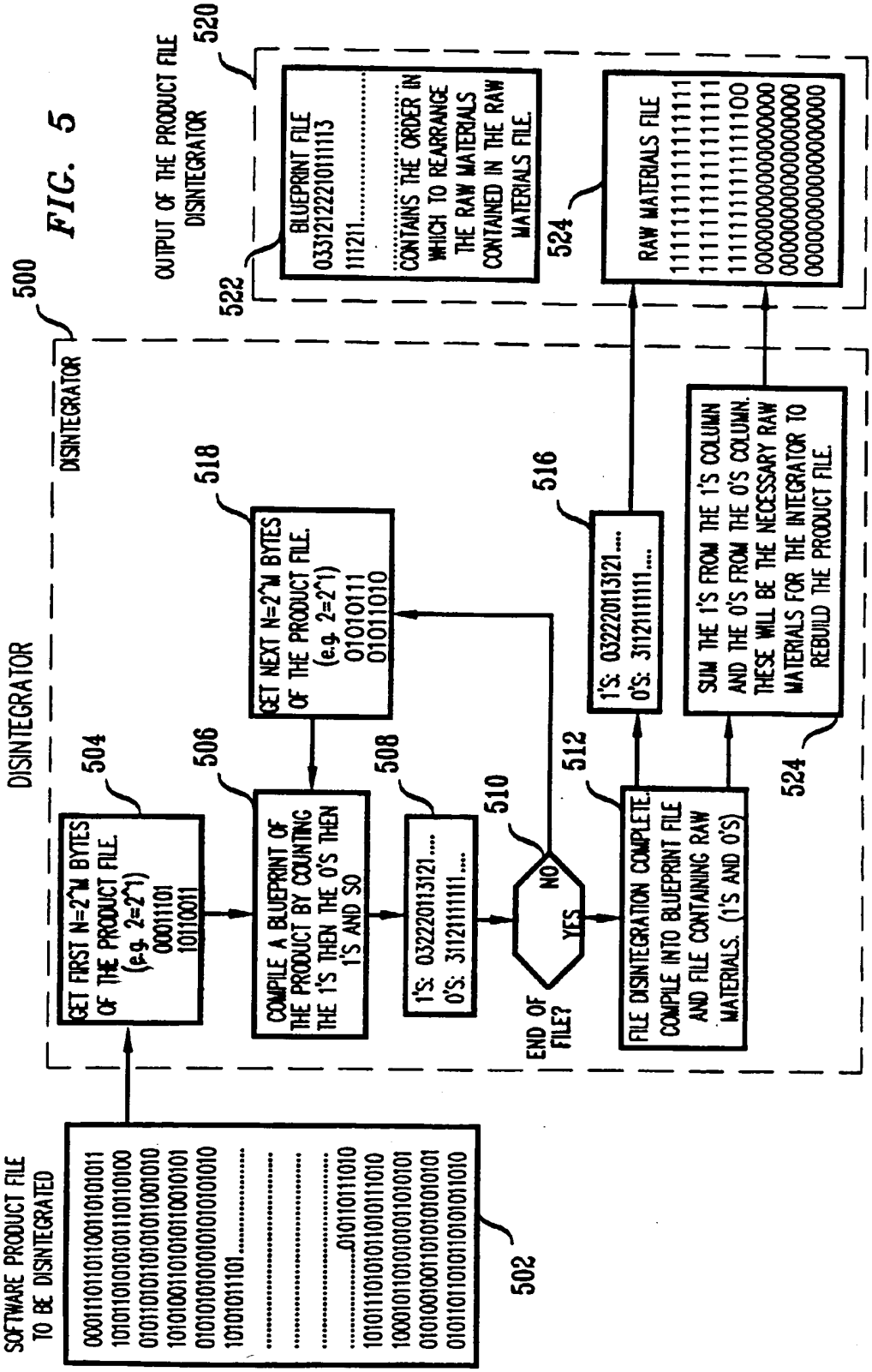

SOFTWARE PRODUCT FILE TO BE DISINTEGRATED
502
DISINTEGRATOR
500
DISINTEGRATOR
GET FIRST N=2^M BYTES OF THE PRODUCT FILE. (e.g. 2=2^1) 00011101 10110011
504
COMPILE A BLUEPRINT OF THE PRODUCT BY COUNTING THE 1'S THEN THE 0'S THEN 1'S AND SO
506
1'S: 032220113121.... 0'S: 31121111111....
508
END OF FILE?
510
NO
YES
GET NEXT N=2^M BYTES OF THE PRODUCT FILE. (e.g. 2=2^1) 01010111 01011010
518
1'S: 032220113121.... 0'S: 31121111111....
516
FILE DISINTEGRATION COMPLETE. COMPILE INTO BLUEPRINT FILE AND FILE CONTAINING RAW MATERIALS. (1'S AND 0'S)
512
SUM THE 1'S FROM THE 1'S COLUMN AND THE 0'S FROM THE 0'S COLUMN. THESE WILL BE THE NECESSARY RAW MATERIALS FOR THE INTEGRATOR TO REBUILD THE PRODUCT FILE.
524
OUTPUT OF THE PRODUCT FILE DISINTEGRATOR
520
BLUEPRINT FILE 033121222101111113 111211..... CONTAINS THE ORDER IN WHICH TO REARRANGE THE RAW MATERIALS CONTAINED IN THE RAW MATERIALS FILE.
522
RAW MATERIALS FILE
524

FIG. 6

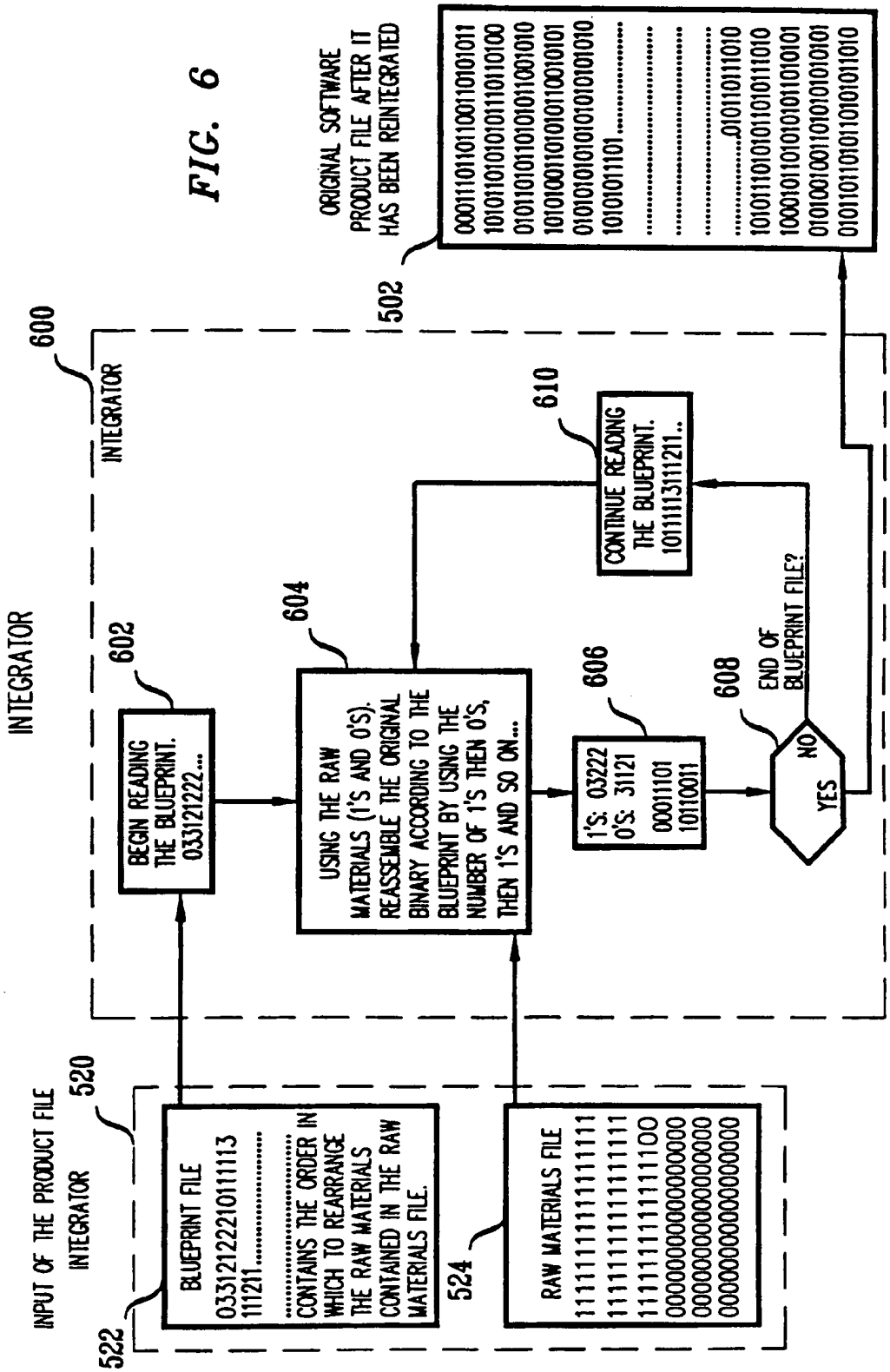

INTEGRATOR
600
INTEGRATOR
INPUT OF THE PRODUCT FILE
INTEGRATOR
520
522
BLUEPRINT FILE
033121222101111113
111211.....
.....CONTAINS THE ORDER IN WHICH TO REARRANGE THE RAW MATERIALS CONTAINED IN THE RAW MATERIALS FILE.
524
RAW MATERIALS FILE
11111111111111111
11111111111111111
11111111111111100
00000000000000000
00000000000000000
00000000000000000
602
BEGIN READING THE BLUEPRINT. 033121222...
604
USING THE RAW MATERIALS (1'S AND 0'S). REASSEMBLE THE ORIGINAL BINARY ACCORDING TO THE BLUEPRINT BY USING THE NUMBER OF 1'S THEN 0'S, THEN 1'S AND SO ON...
606
1'S: 03222
0'S: 31121
000111101
101100011
608
END OF BLUEPRINT FILE?
NO
YES
610
CONTINUE READING THE BLUEPRINT. 1011111313111211..
502
ORIGINAL SOFTWARE PRODUCT FILE AFTER IT HAS BEEN REINTEGRATED
00011101101100110101011
10101101010101110110100
01011010110101011001010
10101000110101011001010
01010101010101010101010
10101011101.....
.....
.....
.....
.....010110111010
10101110101011010111010
10001011010101011010101
01010010011010101010101
01011011010110101011010

FIG. 7

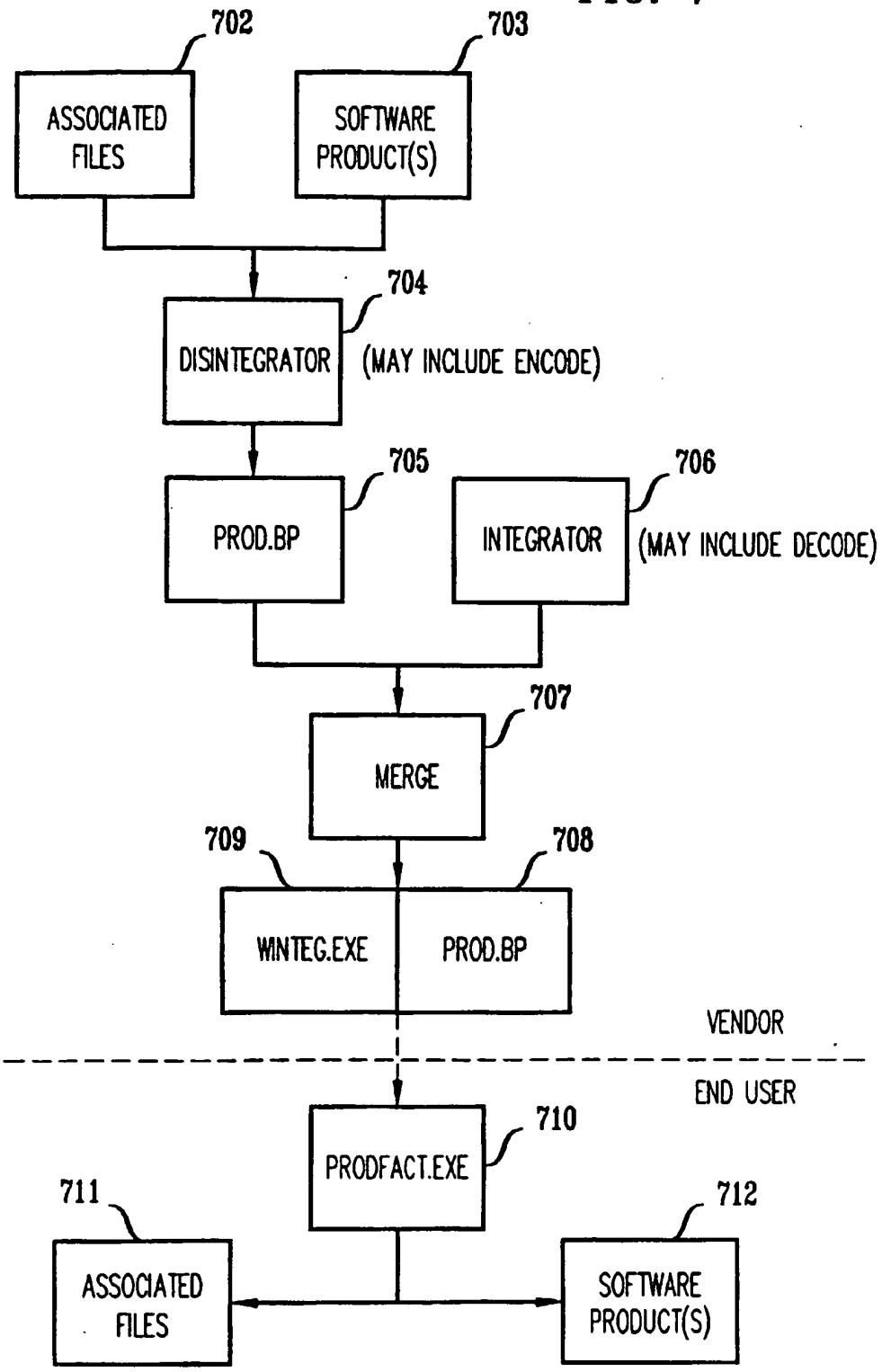
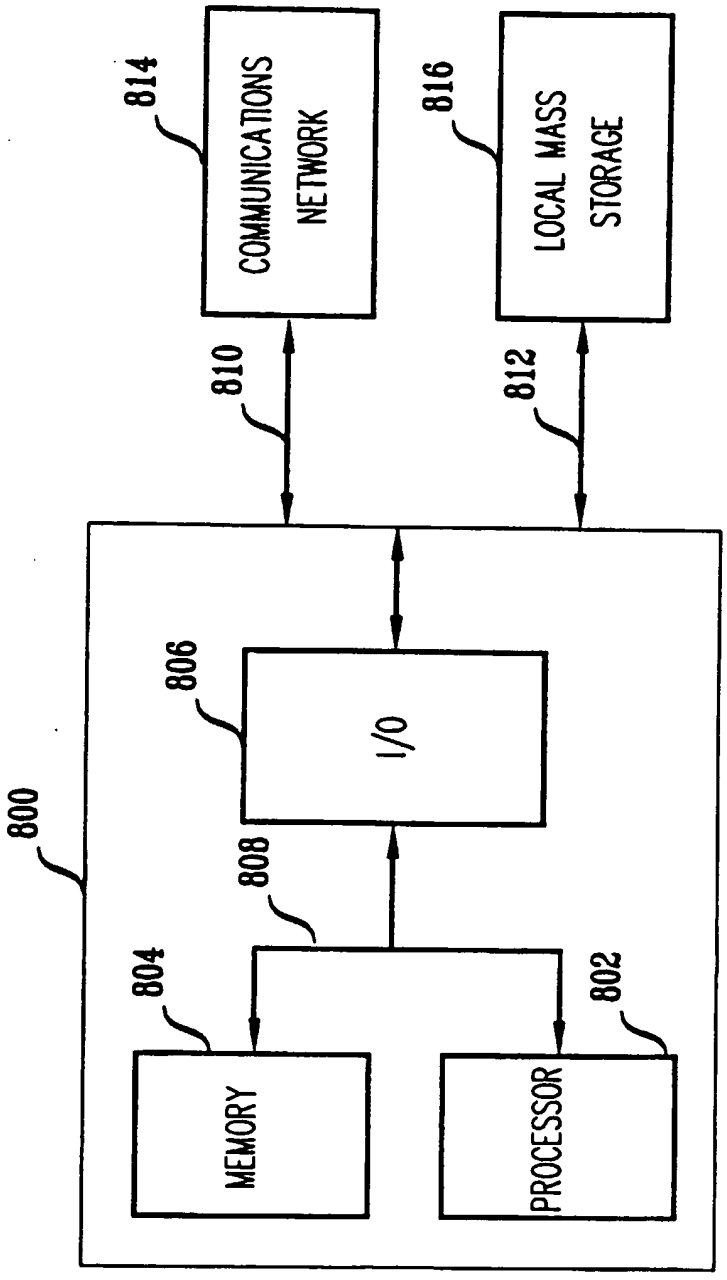

702
703
ASSOCIATED FILES
SOFTWARE PRODUCT(S)
704
DISINTEGRATOR
(MAY INCLUDE ENCODE)
705
706
PROD.BP
INTEGRATOR
(MAY INCLUDE DECODE)
707
MERGE
709
708
WINTEG.EXE
PROD.BP
VENDOR
END USER
710
PRODFACT.EXE
711
712
ASSOCIATED FILES
SOFTWARE PRODUCT(S)

FIG. 8


814
COMMUNICATIONS NETWORK
816
LOCAL MASS STORAGE
810
812
800
806
I/O
808
804
MEMORY
802
PROCESSOR